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UNITED STATES DEPARTMENT OF AGRICULTURE
Office of Foreign Agricultural Relations

COTTON PRODUCTION IN NORTHEASTERN BRAZIL

By P. K. Norris
Senior Marketing Specialist

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COTTON PRODUCTION IN NORTHEASTERN BRAZIL 1/

By P. K. Norris, Senior Marketing Specialist,
Office of Foreign Agricultural Relations.

EARLY DEVELOPMENT

Cotton is perhaps indigenous to Northeastern Brazil. The earlier settlers found the natives growing and using cotton. In a short time cotton production became a source of revenue on the large plantations, particularly in the region around Bahia, Pernambuco, and Maranhão. Cotton exports as early as 1700 are said to have attracted the attention of the Portuguese King, who sent to Brazil several natives of India that they might teach the spinning and weaving of cotton to the slaves and natives of the colonies.

While cotton was an item of income on many of the early plantations, it did not become of major importance until about 1862, when, due to the Civil War in the United States, American cotton was cut off from European spinners. The planters of the northeastern States responded to the demand of European spinners and increased the crop far beyond the local requirements. Annual exports during and immediately following the American Civil War are said to have reached unusually high levels. Following the close of the War and the return to normal production in the United States, the Brazilian crop declined rapidly and in a short time was again relatively unimportant. The freeing of the slaves, the breakdown of the old Brazilian plantation system, and the rise of the rubber industry in the Amazon Valley contributed to a further decline in cotton production. Following the decline of the rubber industry early in the present century, however, many people returned to the northeastern area and both capital and labor were again employed in cotton production. The development of the domestic textile industry about this time stimulated cotton growing and was responsible in part for the renewed interest. Within the last two decades Brazil has become both a cotton-producing and a cotton-consuming country. Recent shifts, however, in the local textile industry from the northeast to the south have influenced production and are changing the outlook in Northeastern Brazil.

PRODUCTION, ACREAGE, AND YIELDS

Production in the northeastern States for the 10 years prior to 1932-33 averaged about 435,762 bales per year, or about 82 percent of the total Brazilian crop. The peak production during this period was a crop of 564,719 bales harvested during the 1924-25 season, and the low production was the 384,804-bale crop of 1928-29. The crop of 1932-33 was one of the smallest crops of recent years being only 258,644 bales. Following 1932-33, the crop of this area increased rapidly, reaching 826,029 bales in 1935-36. Since that date it has declined somewhat. The 1936-37 crop was reported to be 685,741 bales while the 1937-38 crop reached 744,495 bales. The 1938-39 crop is estimated at 640,810 bales, while the 1939-40 preliminary estimate is 691,820

1/ This report, based upon a field investigation by the author, of cotton-growing areas of Brazil was first issued in October 1935. Statistical data since 1933-34 have been included in the revised issue. For a report on cotton production in Southern Brazil see F.S. 63 (revised).

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bales. (See table 1.) Since 1932-33 these States have produced a decreasing percentage of the total Brazilian crop. This decline in the proportion of the crop grown is due to the rapid increases in the southern States rather than to a marked reduction in the northeastern States.

Acreage, like production, has fluctuated widely since 1922-23 (table 1). The record acreage was 2,539,736 acres in 1935-36, while the low point was 1,067,413 acres in 1922-23. The trend of acreage has been upward despite the fact that this region has lost its position of dominance of the Brazilian cotton trade to Southern Brazil.

From 1922-23 to 1931-32 the northeastern States grew on an average about 1,310,534 acres of cotton. This was 81 percent of the total Brazilian acreage. From 1932-33 to 1936-37, due to the heavy increase in the southern States, this area averaged only 53.5 percent of the total acreage of the country. A large part of the northeastern acreage is tree cotton that grows for 5 to 15 years after planting. For this reason annual acreage changes are not as great as in an area where all is annual cotton.

Table 1 - Cotton acreage, production, and yield per acre, Northeastern Brazil, 1922-23 to 1939-40 a/

Year	Acreage	Production b/	Yield per acre
	Acres	Bales	Pounds
1922-23	1,067,413	387,765	174
1923-24	1,085,594	403,428	178
1924-25	1,450,473	564,719	185
1925-26	1,219,807	446,146	175
1926-27	1,238,861	431,156	166
1927-28	1,196,209	390,200	156
1928-29	1,223,140	384,804	150
1929-30	1,570,377	518,372	158
1930-31	1,406,772	402,146	137
1931-32	1,641,690	428,882	125
1932-33	1,177,632	258,644	105
1933-34	1,711,980	483,273	135
1934-35	2,503,123	783,159	150
1935-36	2,539,736	826,029	155
1936-37	2,123,486	685,741	154
1937-38 c/	2,484,803	744,495	143
1938-39 c/	d/ 2,129,651	d/ 640,847	144
1939-40 c/	e/	d/ 691,820	-

Compiled from official estimates of Ministry of Agriculture, Rio de Janeiro, Brazil.
a/ Includes all Bahia, except as noted.
b/ In bales of 478 pounds net.
c/ Preliminary.
d/ Includes northern zone of Bahia. Final estimate 1938-39, first estimate 1939-40. e/ Not available.

According to the data available for both acreage and production (1922-23 to 1937-38) the average annual yield of Northeastern Brazil is about 148 pounds per acre. This compares with 177 pounds per acre for the southern States of Brazil. While the average yield of the northeastern States is below the average yield of the southern area, it must be pointed out that this

region is subjected to wide annual fluctuations. The highest annual yield was 185 pounds reported in 1924-25, while the lowest was 105 pounds per acre during the season 1932-33 (table 1). These wide variations are due primarily to periodical droughts common throughout much of the cotton area of Northeastern Brazil.

COTTON-GROWING AREA

The area referred to as Northeastern Brazil includes the States of Espirito Santo, Bahia, Sergipe, Alagôas, Pernambuco, Parahyba, Rio Grande do Norte, Ceará, Piauhy, Maranhão, and Pará. These States form the extreme northeastern portion of the Brazilian coast. The States of Espirito Santo and Pará are relatively unimportant in cotton production. The total area of the 11 States is estimated at 1,133,253 square miles, or an area four times the size of Texas (table 2). Much of this vast region is forest, jungle, desert, and waste land, uninhabited and practically uninhabitable. While the area is enormous, only a small percentage of it can, by the most liberal estimates, be classed as potential cotton land. The task of clearing the land, developing the transportation facilities, preparing the soil, planting, and cultivating a crop over this large area is one far beyond the ability of the present generation. The cultivation of any considerable part of this vast area will require labor far in excess of the present supply.

Table 2 - Area, cotton acreage, population, and density of population of Northeastern Brazil

State	Area	Cotton acreage 1937-38	Population 1930	Density of population per square mile
	Square miles	1,000 acres	Number	Persons
Espirito Santo	17,252	-	744,695	43.17
Bahia	204,395	161.2	4,432,379	21.69
Sergipe	8,321	98.1	572,922	68.85
Alagoas	11,031	184.6	1,266,046	114.77
Pernambuco	38,322	453.2	3,146,678	82.11
Parahyba	21,591	536.6	1,464,800	67.84
Rio Grande do Norte	20,236	307.5	818,645	40.45
Ceara	57,371	518.1	1,739,062	30.31
Piauhy	94,819	74.1	887,055	9.36
Maranhao	133,674	107.5	1,242,399	9.29
Para	526,241	43.9	1,616,403	3.07
Total	1,133,253	2,484.8	17,931,084	15.82

Compiled from official Brazilian sources.

A liberal estimate of the land under cultivation will not exceed 25 percent of the total area. This includes the land used for grazing purposes as well as that actually under crops. The cotton area at present is equal to about 2,500,000 acres. From the standpoint of available land, cotton could no doubt be extended considerably in the northeastern States, but the extension would depend upon factors other than available land.

The cotton-growing area of Northeastern Brazil may be divided into three, or perhaps four, districts. The first is the narrow coastal plain ranging from 10 to 50 miles in width and extending the full length of the

coast. Back of the coastal plain is a second district which includes the foothills and a low coastal mountain range. This district, while not so well watered as the coastal area, produces fair crops during the years of normal rainfall distribution. The third district is a high arid and semiarid plateau lying back of the coastal mountains. This district is the northern extremity of the Great Brazilian Plateau which extends into Southern Brazil. The western and southern portions of the States from Ceará to Bahia are within this third district. Much of the plateau is broken by low hills. Because of the light rainfall over most of it, the vegetation is rather scant and the country is open and resembles the arid section of the western United States.

While a part of the northeastern States is in the Amazon basin, and might be called a fourth district, this area grows very little cotton. In the State of Pará, cotton is grown to a small extent in the Amazon Valley, but it is of little importance and, until the population increases and the unfavorable natural factors are overcome, will remain relatively unimportant.

CLIMATE

The climatic conditions of Northeastern Brazil are rather unusual, particularly with respect to rainfall. It is the general impression that, because this area is so near the equator, the rains are heavy and that the country is completely covered with heavy forests and jungles. As a matter of fact, there are large areas between Bahia and Ceará that receive very little rain. The native vegetation resembles the desert vegetation of New Mexico and Arizona. Rainfall along the coastal plains may be as much as 60 inches or more annually, while at points in the interior plateau it may amount to almost nothing. Not only is the rainfall light, but the distribution of the rainfall has an important bearing upon the production of crops. The desert area of Northeastern Brazil receives most of its meager rainfall from January to June. After June or July, as a rule, very little rain falls in the interior. This area is subject to long periods of extremely dry weather accompanied by intense heat. During these periods the people of the area are forced to move to the coastal plains, returning again as soon as it rains.

This extremely dry weather over a large part of Northeastern Brazil is explained by the fact that the trade winds blowing across the Atlantic in a northeasterly direction lose much of their moisture when they strike the coastal mountains before reaching the central plateau. The winds from the north and northeast strike the extreme north coast of Brazil and, because there are no mountains in this area, carry the moisture much farther inland. This accounts for the heavy rains of the Amazon Valley and the coast west of Piauhy, while the area back of the coastal mountains is a semi-desert.

It appears that the annual rainfall over much of the interior ranges from 35 to as low as 6 inches. Fair crops of tree cotton in this area are grown with an annual rainfall of as low as 18 inches if properly distributed throughout the growing season. Normally, about 90 percent of the precipitation occurs from January to July with about half of the total in March, April, and May. Very little rain is to be expected from August to November and about 10 percent of the total during December.

In seasons of poor distribution of rainfall the first 3 months of the year often receive 90 percent or more of the annual total (table 3). This distribution results in a very low yield. Most of the short-crop years have been the result of poor distribution.

Table 3 - Annual average rainfall and monthly distribution in Northeastern Brazil

Month	Average rainfall a/	Distribution in good seasons b/	Distribution in poor seasons b/
	Inches	Inches	Inches
January c/	3.9	3.5	8.5
February c/	5.3	4.5	10.5
March c/	6.4	6.5	12.0
April c/	5.3	7.5	-
May	3.0	4.5	-
June	2.0	2.5	2.5
July	1.1	1.5	-
August	.8	-	-
September.....	.4	-	-
October.....	1.0	-	-
November.....	1.9	-	-
December	2.4	3.0	-
Total	33.5	33.5	33.5

a/ Ten stations in the cotton-growing area of the northeast; both coast and inland areas.
b/ Based on private reports and records of cotton planters obtained by the author.
c/ Months in which cotton is planted.

Table 4 - Annual variations in rainfall at selected points in the interior of Northeastern Brazil a/

Year	Rainfall	Year	Rainfall
	Inches		Inches
1925.....	25.8	1931.....	8.9
1926.....	22.6	1932.....	5.9
1927.....	17.6	1933.....	11.1
1928.....	11.7	1934.....	21.8
1929.....	19.0		
1930.....	9.5	Average.....	15.4

a/ From private reports and records of cotton planters (inland points).

Temperatures are exceedingly high throughout Northeastern Brazil, and for that reason rainfall is less effective than in areas of low temperature. Along the eastern coast high temperatures are accompanied by high humidity and, were it not for the trade winds, it would be very unpleasant. During the rainy season the interior plateau is comparatively cool, but during the dry seasons the temperatures are extremely high (table 5).

Table 5 - Normal annual, maximum, and minimum temperatures at selected stations in the cotton-growing area of Northeastern Brazil

Station location	Average annual	Average maximum	Average minimum
	°F.	°F.	°F.
Para.....	78.4	87.4	71.3
Maranhao.....	79.7	85.6	74.8
Ceara.....	81.1	89.8	75.0
Rio Grande do Norte....	78.8	87.8	66.4
Parahyba.....	77.4	85.3	70.0
Pernambuco.....	70.9	81.7	63.1

Compiled from official Brazilian sources.

SOIL

The soil of Northeastern Brazil ranges from a light sand to a heavy clay. Over much of the dry plateau of the interior a coarse sandy or gravelly soil is common. The coastal-plain soils are largely sandy loams and clay soils. The interior-plateau soils, with the exception of the gravelly soils, are relatively fertile and when watered produce good crops. The soils of most of the river valleys are of alluvial formation. The soils of the coastal plain, in spite of the fact that this is the oldest farming area of Brazil, are the most productive. This is due, however, more to rainfall than to soil fertility.

In parts of the interior plateau the rock is so near the surface that the cultivation of crops is impracticable. Much of this area produces very little grass and is of little value as grazing land. Where the soil is fertile and the rains more regular, the area supports large herds of cattle, sheep, and goats. The better soils of the interior are found along the rivers and creeks. These soils range from a sandy loam to a heavy clay loam, and on this type of soil the bulk of the tree cotton of Northeastern Brazil is grown.

COMPETITIVE ENTERPRISES

Over most of Northeastern Brazil the competition between cotton and other crops is for labor rather than land. If cotton were not grown, no cash crop would be produced.

When the rubber industry of the Amazon Valley began to decline, hundreds of people left the rubber districts and settled in Northeastern Brazil. These people took up the production of cotton as a cash crop, and its development has been largely due to their efforts. Livestock raising is an important occupation of the interior. This interior country produces large numbers of cattle, sheep, and goats. Along the coastal plain, where the population is more dense, such crops as sugar, tobacco, and citrus fruits are grown. The State of Bahia produces the bulk of the Brazilian tobacco crop, while Pernambuco, Alagôas, and some of the other northeastern States produce large quantities of sugar. In addition to tobacco, the State of Bahia produces most of the cocoa crop. In Ceará and the States west of Ceará the production of carnauba wax is an important industry. This wax is gathered from a palm tree, which is grown wild and requires little or no cultivation. This area also yields large quantities of Brazil nuts and other semiwild crops. Coffee is grown in every State of Northeastern Brazil but the total is equal to only about 10 to 15 percent of the total Brazilian production. Espirito Santo is perhaps the leading coffee-growing State of this area.

LABOR SUPPLY

The population of Northeastern Brazil is estimated at 17,931,084. The heaviest-populated area is the coastal plain, where in some sections the population is very dense. Estimates indicate that the heaviest populated rural section of Brazil is the coastal plain between Pernambuco and Natal. The people of this section, while engaged in agriculture, are also engaged as laborers in the cotton-spinning mills. They produce a part of their own food but to a large extent depend upon their labor in the mills for their cash income. Because of the decline in the price of sugar, several of the larger sugar plantations along the coast find it impossible to maintain past wage

levels. As a result, a number of laborers left the sugar plantations and took up cotton production. In other sections of the coast the growing of sugar on the larger plantations has been replaced to some extent by cotton.

The population of the interior is rather scant. There are few cities of any importance. The people seem to have a peculiar fascination for this semidesert region and even though they are sometimes forced by long dry periods and crop failure to migrate to the coast, they return as soon as rains have fallen. These people produce their own food in addition to cotton. Permanent agriculture, however, is rather difficult under conditions prevailing over most of the interior and, were it not for the perennial type of cotton grown, it is possible that this district would be of very little value other than for grazing.

The people are of Portuguese and native Indian stock, while along the coast, particularly in the State of Bahia, the descendents of the early slaves are common. As a rule, the people of Northeastern Brazil may be said to be a mixture of three races, the white, the Negro, and the Indian. While the climate is, on the whole, not conducive to work, the average native makes little effort to overcome this natural handicap. The average agricultural laborer is inclined to exert little more than the effort required to meet his limited wants.

PRODUCTIVE CREDIT

The production of perennial cotton requires very little capital. The average farmer has only a few acres, usually planted on the lowlands, along the creek valleys. Because this cotton stands from 5 to 15 years, it is not necessary to replant each season. About the only expense required to produce it is labor. Once it is established, it requires very little cultivation.

In sections of the northeast the cotton ginner or buyer makes small advances to growers. In recent years, with the export demand increasing, this practice has become more common, but as a rule there is little organized effort to supply credit to growers. Most growers have very little to offer in the way of security for loans.

THE QUALITY OF THE CROP

The cotton of Northeastern Brazil is of two types: the perennial or tree cotton, and the annual or upland. Much of the tree cotton, however, is badly mixed with the annual varieties. Originally the tree cotton was of an exceptionally long staple, often averaging as much as 1-1/4 inches in length. Where this cotton is free from mixture, the staple is about 7/8 to 1-1/4 inches in length (table 6).

The annual cottons, originally from American upland seed, are grown along the coast and are referred to as "Matta" cotton to distinguish them from the tree cottons. In the area between the coast and the interior plateau, especially in the regions of heavier rainfall, some annual cotton is grown, but the tree cotton is the predominating variety. It is in the area in which both the upland and the tree cottons are grown that the greatest mixtures occur. Few Brazilian farmers realize the importance of pure varieties and often plant the annual cotton in fields of tree cotton. This not only produces a crop of mixed staple but also results in the deterioration of both varieties by crossing. In many parts of Northeastern

Brazil the once well-known varieties of tree cotton have been practically eliminated by this method of mixture and crossing. The cotton grown along the coast usually averages about 7/8 to an inch in staple. Much of this cotton was originally used by local mills, leaving the tree cotton for export. In recent years, however, the upland, as well as the tree cotton varieties, has been exported.

Table 6 - Staple length of cotton classed for export from northern Brazil by States, 1937
(In bales of 478 pounds)

Northern States	Staple length a/				Percentage			
	Less than 7/8 inch	7/8 to 1-1/8 inch	1-1/8 inch and longer	Total b/	Less than 7/8 inch	7/8 to 1-1/8 inch	1-1/8 inch and longer	Total b/
	Bales	Bales	Bales	Bales	Per-cent	Per-cent	Per-cent	Per-cent
Pará	17	8,694	92	8,803	0.2	98.8	1.0	100.0
Maranhao	511	24,889	0	25,400	2.0	98.0	0.0	100.0
Piauhy	360	15,288	2	15,650	2.3	97.7	c/	100.0
Ceará	824	47,700	35,740	84,264	1.0	56.6	42.4	100.0
Rio Grande do Norte	680	8,779	92,538	101,997	0.7	8.6	90.7	100.0
Parahyba	4,082	45,080	172,146	221,308	1.8	20.4	77.8	100.0
Pernambuco	1,058	60,276	20,414	81,748	1.3	73.7	25.0	100.0
Alagoas	198	26,055	11	26,264	0.8	99.2	c/	100.0
Sergipe	93	5,023	13	5,129	1.8	97.9	0.3	100.0
Bahia	4,204	15,162	1,007	20,373	20.6	74.4	5.0	100.0
Total northern States	12,027	256,946	321,963	590,936	2.0	43.5	54.5	100.0

Boletim de Informacoes Number 7 Ministerio da Agricultura Departamento Nacional da Producao Vegetal, Sevico de Plantas Texteis, Rio de Janeiro.
a/ Millimeter lengths were converted to inches on the assumption that 24 millimeters and less equal 7/8-inch and shorter; 24 to 30 millimeters equal 7/8-inch to 1-1/8 inches; and 30 millimeters and longer equal 1-1/8 inches and longer. These conversions are made with the knowledge that differences in classing and in the collection of this information may affect the comparability of these lengths with similar lengths of American cotton classed on Official Standards, but a comparison of staple length designations for actual samples received from Brazil and classed by qualified Government classers in the United States indicates that these conversions are approximately correct.
b/ Excludes mixtures, linters, and residue.
c/ Less than 0.05 percent.

The grade of Northeastern Brazilian cotton is low, due largely to the method of picking and handling. In addition to being poorly picked, it is often ginned in a plant where no cleaning machinery is used. The cotton gins of Northeastern Brazil are generally small, consisting in the main of one-stand gins, usually of about 50 saws. Many of the gins, however, are equipped with a small press where the lint is pressed into bales weighing about 200 pounds.

The cotton ginner is usually the primary buyer, buying in the seed and ginning all cotton together irrespective of quality. After the cotton has been ginned, it is usually sold to larger merchants who send it to the coast. At the seaport the country bales are broken and repressed into uniform high-density bales. Because so much of the northeastern cotton is badly mixed, an effort is often made at the time the cotton is compressed to separate the broken bales into the two types of cotton. The method used is based upon the theory that a trained man can detect a slight color difference between the two types. The open bale is spread out and the men separate the lint. This method, of course, is very crude and is only approximate, but it eliminates a great deal of the mixtures and is said to improve its value. It is not uncommon, however, for European spinners to report a high percentage of waste in some Northeastern Brazilian cotton. This lack of uniformity has been a factor in the increased use of Southern Brazilian cotton over northeastern cottons by the southern textile industry.

HANDLING AND MARKETING METHODS

The cotton ginners buy from the growers. In most cases, they are small operators who are unable to finance large deals and are, therefore, often associated with exporters and larger merchants. In a few places the exporters are becoming interested in the construction of modern, up-to-date ginning plants and are buying direct from the growers. The production of cotton along the coast requires more capital, which in most cases is readily obtainable. In the interior the lack of production credit is no doubt a limiting factor in cotton production. Many farmers of this area would grow cotton if credit were available.

Most of the Northeastern Brazilian cotton is sold under a local trade name, which is usually the variety name or the name of the district in which it is grown. Such cottons as "Moco," "Serido," and "Matta" are examples of local terms. "Moco" is a variety name, while "Serido" refers to the district from which the cotton comes. Both are tree cottons. "Matta" is a name applied to the upland cotton grown along the coast.

The Brazilian Government, through its Ministry of Agriculture, has established grades for each of the various types of cotton grown within the country. Of these, physical standards have been promulgated for some, while others are descriptive. While these grades are not exactly comparable to American standards, it is generally recognized that No. 5 of the Brazilian standard correspondends roughly to No. 7 of the American standard; that is, Brazilian middling is usually of the same grade as American low middling. The staple length of Brazilian cotton is expressed in millimeters.

TRANSPORTATION

Transportation facilities of the Northeastern States are, on the whole, poor. The railroads in this area extend back but a short distance from the seacoast towns. In addition to being inadequate, the railroad equipment is in a dilapidated condition. There are but a few lines of standard gauge road in the entire area. The road beds are poor and unkept and the service slow and expensive.

During the wet season a few of the rivers are open to small boats. The extremely low rainfall prevailing in the interior makes it impossible to use river transportation throughout the year. Coastwise boat service is maintained between the northern ports.

Highways are few and usually unimproved. With few exceptions, there are no paved highways in Northeastern Brazil. During the wet seasons, the highways are practically impassable, but during dry seasons they are in constant use. Motor truck and bus transportation are becoming common.

Transportation is one of the major problems in the development of Northeastern Brazil. Many farmers of the interior are still dependent upon the primitive ox cart or mule pack train for the transportation of their crops to market. In recent years, as a drought relief measure, the Government has built dirt highways in the northeastern States, but when the size of this area is considered, it is obvious that there are still large sections long distances from highways and railroads. In much of the area the people are still dependent upon the slow native ox cart.

CONSUMPTION AND EXPORTS

The oldest spinning and weaving establishments of Brazil are located in Northeastern Brazil. These plants are located along the coast, principally in the States of Pernambuco, Alagôas, Sergipe, and Ceará. In recent years, however, the output of the Southern Brazilian mills has surpassed that of the mills of the northeast. The total cotton consumption of Brazil during the last year for which data are available (1937) was 828,000 bales, of which approximately 167,540 bales were consumed in the northeastern States.

The textile industry of Southern Brazil at one time used large amounts of northeastern cotton, but with the recent expansion of cotton production and the improvement of quality of the crop, the southern area is using less northeastern cotton. A large percent of the northeastern crop is therefore sold abroad (table 7).

Exports for Northeastern Brazil, like the exports of Southern Brazil, have increased rapidly since 1934. With the exception of 1929 and 1930, exports from this area did not exceed 100,000 bales during the period from 1924 to 1933. During the 5 years between 1934 and 1938, exports averaged 335,190 bales. The peak of 383,844 bales was reached in 1937. In 1938, the last year for which complete data are available, 314,769 bales were exported.

Table 7 - Cotton: Exports and consumption, Northeastern Brazil, 1923 to 1938
(In bales of 478 pounds)

Calendar year	Exports	Consumption	Calendar year	Exports	Consumption
	Bales	Bales		Bales	Bales
1924	25,593	a/	1932	2,377	a/
1925	94,886	a/	1933	45,346	119,491
1926	74,720	a/	1934	293,615	152,316
1927	50,448	a/	1935	372,590	158,454
1928	46,133	a/	1936	311,133	170,773
1929	207,355	a/	1937	383,844	167,540
1930	139,983	a/	1938	314,769	a/
1931	95,377	a/			

Compiled from official Brazilian sources.
a/ Not available.

COTTON PESTS

With the exception of the Mexican boll weevil, Northeastern Brazil has about all the common cotton insects. So far as is known, the Mexican boll weevil has not invaded the Brazilian cotton belt, although the pink boll worm, the boll worm, and several other destructive insects are widespread. Over large areas of the interior plateau, grasshoppers are also a menace to crops. Cotton and other crops are often damaged or completely destroyed by grasshoppers.

While no reliable data as to the damage of insect pests are available, it is recognized that pink boll worm is one of the most destructive cotton insects of the country. The treatment of the planting seed with chemicals or the exposing of the seed to the direct rays of the tropical sun for several hours is a common practice for the control of pink boll worm. When properly carried out, either of these treatments gives a fair degree of protection, but often, due to the manner in which the treatment is performed, it is practically worthless.

The common boll worm does a great deal of damage in the humid coastal-plain area. The damage in this area is high, especially if the fall rains are heavy. As a rule, however, the boll worm does little damage in the dry interior plateau.

The semiarid interior plateau affords an ideal breeding ground for grasshoppers. While the damage may not be widespread, these insects are present somewhere in the interior every season and are very destructive in such areas.

The most common cotton plant diseases are also present in the northeastern cotton belt. While sometimes serious, they are as a rule not as destructive or as widespread as the insect pests.

The absence of frost and freezing weather, and the continuous growth of the cotton plant, especially the tree cotton, create a condition favorable for all kinds of cotton insects and diseases. These conditions also render control measures extremely difficult once the pest becomes established. The damage from insects and disease may be expected to increase as the area of cotton is increased.

GOVERNMENT AID TO COTTON PRODUCTION

Considerable effort on the part of the Government to promote construction of irrigation projects in Northeastern Brazil has been made. While a number of Government projects have been outlined, but few have been completed, and the area served by these is relatively small. Should the Government complete its irrigation projects, particularly those in the States of Ceará and Rio Grande do Norte, this section of Brazil will become more productive from the standpoint of both food crops and cotton.

As temporary relief measures, the Government has spent large sums of money in the construction of highways and small reservoirs in the interior. During the periods of extreme drought, it is often necessary to extend relief to large numbers of people. As long, however, as the Government depends upon relief labor for the completion of its irrigation projects, real

progress will be slow. The expenditure of large sums as temporary or emergency relief measures has been of little value in the completion of the irrigation program.

The most important influence this type of relief has had on cotton production is that it has enabled hundreds of farmers to remain in the area during the drought. As soon as rains come, the relief work is discontinued and they begin farm operations again.

The Federal Government has in recent years taken a special interest in the production of cotton in Northeastern Brazil. Cotton experimental stations and laboratories of the Federal Government have been established. A number of State experimental stations have been opened and the distribution of pure seed has received increasing attention. The decrees regulating the distribution of seed, the treatment of seed for the eradication of the pink boll worm, the inspection and licensing of cotton gins, and the classification of cotton exported have had an influence on increasing the quantity and improving the quality of Northeastern Brazilian cotton. In addition to this direct influence and assistance, the Federal Government has, through its tariff policy, practically prohibited the importation of foreign cotton, thus requiring mills to use locally grown cotton.

Cotton merchants of Northeastern Brazil have for several years realized the importance of cotton as a cash crop and are now making a special effort to stimulate production and expand exports. Local newspapers, Chambers of Commerce, and other business organizations are engaged in stimulating interest of farmers in cotton growing.

Another factor that has aided exports of cotton is the policy of the Government with respect to the control of exchange. At various times during the past several years the exporters of cotton have been allowed to sell foreign exchange on the open market. During this period the percentage allowed to be sold on the open market has varied, but the policy of allowing cotton exporters to take advantage of the open market has enabled them to receive more local currency than the exporters of other commodities who were not permitted to sell on the open market.

OUTLOOK FOR COTTON PRODUCTION IN NORTHEASTERN BRAZIL

Production in this section of Brazil has fluctuated widely in past years. In the interior, good yields are obtained during seasons of favorable rain, but in years of short rainfall very little cotton is harvested. Plantings of new areas are made in years of good rains and, as the plants often stand for several years, the total acreage harvested in any year is the result of an accumulation of several years of planting. Expansion in this area, therefore, depends upon the rainfall and the labor supply. Much of the interior is so sparsely settled that it is not likely to expand acreage rapidly. Inadequate transportation places rather severe limitations upon expansion. Areas that might produce cotton if transportation were available are accessible now only by primitive ox cart and mule pack trains.

The possibility of irrigation developing to the point where it will be an important stimulus to production in the interior depends to a large degree upon the Governmental policy but is rather remote.

The expansion of cotton acreage in the district between the coastal plain and the interior plateau, where the rainfall is heavier and the distribution more uniform, depends to a large extent upon the labor supply and the general attitude of the people. Much of this area is far from central markets and handicapped by poor transportation. There is land that could be used for cotton production, but even through the rainfall is more certain than in the interior, the number of people available for the production of cotton is limited. Rainfall, though greater than in the interior, is an important factor in this area.

The district along the coast, where the rainfall is heavy and where the most densely populated areas of rural Brazil are located, appears to offer possibility for expansion. The population of this section is sufficient to provide labor for cotton growing, but many of the people are engaged in the production of sugar, tobacco, and food crops. Others are also occupied in industrial work, particularly in cotton textile mills. While the competition of crops such as sugar is not of major importance, it has an influence on the expansion of cotton acreage. The prices received for sugar and other crops have, at times in the past, been so low that several of the larger planters who once produced sugar in this area are now using their labor and land for the production of cotton. Should this condition again occur, it is likely that cotton acreage along the coast would increase.

The possibility of expanding cotton production in the area of the Amazon Valley is rather remote. At the present time there is a small amount of cotton grown in the State of Pará, which is, in fact, in the Amazon Valley. Cotton is grown at a few points as far as 500 miles up the river, but these areas are small. The rainfall is heavy and vegetation grows so rapidly that it requires constant cultivation to keep cotton fields free of weeds and grass. This naturally requires a great deal of labor, and the people of this area are, as a rule, inclined to avoid labor as far as possible. They have lived for generations with little effort and consequently feel very little desire to undertake the production of a crop involving as much labor as cotton. Under these conditions the expansion of cotton in the Amazon Valley will be very slow. It is doubtful that this section will become important at any time in the immediate future.

The history of cotton production of Northeastern Brazil is marked by periods in which production reached high levels, only to decline, in some cases to an almost negligible point. The wide fluctuations of the past are explained by such events as the American Civil War, the freeing of the Brazilian slaves, the decline of the Amazon Valley rubber industry, and the rise of the local textile industry. While these as well as other social and economic factors influenced production, it is noticeable that, in most cases, the decline following a period of high production did not reach the previous low level. Over the period for which data are available, the trend of production has been upward.

SUMMARY

Cotton is an old and well-established crop of Northeastern Brazil. The northeastern States until recently have produced about 75 percent of the total Brazilian crop. In recent years, production has increased; however, the percentage of the total Brazilian crop has declined due to the rapid increase in the southern States of Brazil. Acreage, like production, has fluctuated widely. Yields have fluctuated between 185 and 105 pounds per acre in past years.

The total area of the States referred to as Northeastern Brazil is estimated at about 1,133,253 square miles. While this is an area about four times as large as Texas, only a small percentage of the total can be classed as potential cotton land. Much of it is in forest, jungle, desert, and waste land, uninhabited and practically uninhabitable. The chief districts of production are, (1) the coastal plain, (2) the low foothills and coastal mountains, and (3) the interior plateau or plain lying beyond the coastal mountains. The coastal plain is a well-watered area producing a variety of tropical and semi-tropical crops, while the foothill district and the interior plateau are semidesert areas.

American upland cotton is grown in the coastal-plain region and to some extent in the foothill district, while the interior plateau produces the famous Brazilian tree cotton. Due to careless methods of handling and marketing, many of the varieties of the tree cottons are badly mixed and the staple is noticeably lacking in uniformity.

In the coastal-plain district, cotton production is chiefly limited by the competition of other enterprises for the available labor supply. While this section is one of the most densely populated areas of Brazil, many of the people are employed in industry and live in cities and towns. Much of the agricultural labor is engaged in the production of such crops as sugar, tobacco, cocoa, coffee, and food crops. In recent years these crops have not been as profitable as heretofore, and some of the large planters, particularly sugar planters, have turned to cotton as a cash crop. There are large sections in the coastal-plain area where the soil and climatic conditions are favorable for cotton.

In the foothill district, between the coastal plain and the interior plateau, much of the soil is suitable for cotton, but climatic conditions are often unfavorable, insect damage high, and yields uncertain.

In the interior plateau, the amount of rain and its distribution during the season are the principal factors determining the production of cotton. In years of normal rainfall and distribution this area produces large crops, but during seasons of light rainfall or poor distribution yields are reduced and production may be very small. Two or three years of extreme drought occurring as they often do in succession materially reduce the cotton acreage in the interior. The poor and inadequate transportation facilities, the scant population, and the lack of production credit influence the cotton production of the interior-plateau district of Northeastern Brazil.

The history of cotton production in Northeastern Brazil is marked by wide fluctuations. The decline following periods of high production has not as a rule reached the previous low level and the trend has been upward. The present high production, may not represent the peak of the upward trend; but in view of the many limitations and production problems of this section, it is reasonable to expect that further expansion will be at a retarded rate, and that production will continue to fluctuate from year to year.

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